Pertanika J. Soc. Sci. & Hum. 34 (S5): 157 - 172 (2026)

PERTANIKA JOURNALS

SOCIAL SCIENCES & HUMANITIES

Journal homepage: http://www.pertanika.upm.edu.my/

Sustainability and Relevance of Traditional Medicine among the Temiar Community in Modern Life at RPS Kuala Betis, Kelantan

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ABSTRACT

Traditional medicine among the Temiar community at RPS Kuala Betis combines herbal knowledge with sewang-based healing and cultural practices. Development, environmental change, easier access to biomedical care, and market exposure have altered how this knowledge is obtained, transmitted, and practised. This study explores strategies through which the community sustains traditional medicine while adapting selectively to modern life. A qualitative ethnographic approach involved 22 informants (14 women, 8 men), using interviews, participant observation, and document analysis during fieldwork from July 2023 to August 2024; data were analysed in NVivo 12 Plus. The findings show four interrelated strategies. First, the community practises medical pluralism, using modern health services alongside selected traditional practices. Second, knowledge is transmitted through everyday oral interaction and participation in collecting and preparing herbs and sewang materials. Third, herbal products are adapted to contemporary markets through improved packaging, pricing, training, exhibitions, and limited digital marketing. Fourth, cultural boundaries remain important: sacred medical and death sewang are not positioned as tourism products, whereas performance sewang can be shared publicly. Sustainability therefore reflects community-led adaptive continuity, in which practices are selectively modified while culturally sensitive knowledge and ritual boundaries are protected. The study contributes a locally grounded account of cultural resilience, intergenerational learning, livelihood adaptation,

ARTICLE INFO

Article history:
Received: 05 September 2025
Accepted: 20 October 2026
Published: 20 November 2026

DOI: https://doi.org/10.47836/pjssh.34.S5.07

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and institutional support, with implications for community-led heritage programmes, Orang Asli wellbeing, and culturally appropriate policy design.

Keywords: Cultural resilience, ecotourism, knowledge transmission, Orang Asli, sewang, Temiar, traditional medicine

INTRODUCTION

Traditional medicine is both a health practice and a form of cultural heritage. Among the Temiar, medicinal knowledge is embedded in relationships among people, forests, spiritual understandings, customary rules, and intergenerational learning. Its preservation is therefore important not only because particular remedies or rituals may continue to be used, but also because the knowledge carries language, identity, environmental understanding, social relationships, and community authority. Contemporary scholarship similarly emphasises that Indigenous and local knowledge systems are dynamic biocultural systems whose continuity is threatened by rapid social-ecological change while remaining relevant to sustainability and wellbeing (Fernández-Llamazares et al., 2021; Turner et al., 2022).

The Temiar are part of the Senoi grouping of Orang Asli communities in Peninsular Malaysia and have long maintained close relationships with forest environments and inherited cultural practices (Ramle et al., 2020). At RPS Kuala Betis, traditional medicine includes the use of herbal plants and sewang. Development and modernisation have created new opportunities, including access to clinics, transport, training, markets, and communication technologies, but they have also changed access to forest resources and the conditions under which knowledge is learned and practised. The original field accounts in this study show that some community members now use biomedical services because they are easier to access while still retaining sewang or herbal practices as meaningful alternatives or complements. Broader Orang Asli research also indicates that secure land ownership can contribute to Indigenous economic empowerment, which is relevant because access to land and forest resources underpins many resource-based cultural and livelihood practices (Mohd Khori et al., 2024).

Preservation must therefore be understood as more than keeping practices unchanged. Indigenous knowledge can remain viable through selective adaptation, provided that communities retain authority over what may be shared, modified, commercialised, or kept culturally restricted. This perspective is consistent with work on Indigenous cultural wellbeing, sovereignty, and community-led knowledge governance, which stresses that health and cultural continuity are interconnected and that external programmes should not displace Indigenous decision-making (Biles et al., 2024; Joseph, 2024; Smith, 2012).

Existing Malaysian studies have documented Orang Asli traditional knowledge, cultural change, ritual

transformation, and institutional roles (Ahmad Khairuddin & Hanafiah, 2021; Jalaludin & Abdullah, 2020; Rosnon et al., 2018; Syuhana Khalid, 2014). More recent research has also documented Orang Asli plant knowledge and its vulnerability to environmental and generational change (Tharmabalan, 2023). A 2024 study conducted at RPS Kuala Betis specifically examined Temiar herbal remedies and their potential as local/ecotourism products (Lokman et al., 2024). The present study differs by analysing herbal medicine and sewang together and by examining how intergenerational transmission, plural healing, commercial adaptation, cultural boundaries, and JAKOA support jointly shape the sustainability of traditional medicine.

Accordingly, the study addresses the following research aim: to explore the strategies employed by the Temiar community at RPS Kuala Betis to preserve and adapt traditional medicine in modern life. Analytically, the paper asks how continuity is produced through selective change and how community practices, institutional support, and cultural safeguards interact to produce sustainability outcomes.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Indigenous Medicine, Biocultural Knowledge and Health Sovereignty

Traditional medicine is not reducible to a catalogue of remedies. It is often embedded in culturally specific understandings of health, relationships to land, spirituality, kinship, and collective memory. Contemporary ethnobiological scholarship argues that locally grounded knowledge can contribute to broader sustainability debates only when its contextual and cultural specificity is preserved (Fernández-Llamazares et al., 2024). Turner et al. (2022) similarly emphasise the close relationship among Indigenous knowledge, ethnobiology, biodiversity, and sustainability. At the livelihood level, forest resources have also been documented as an important source of income for Orang Asli communities, reinforcing the link between ecological access, household economy, and the continuity of local knowledge (Ab Manaf et al., 2021).

A sovereignty-oriented perspective adds an important ethical dimension. Indigenous health interventions are more durable when communities have meaningful authority over priorities, knowledge, and implementation (Joseph, 2024). In this study, this principle is especially relevant to the distinction between knowledge that may be publicly shared, such as performance sewang, and sacred forms of medical or death sewang that community members regard as inappropriate for tourism. A decolonial approach therefore requires researchers and institutions to treat Temiar knowledge holders as authorities rather than merely sources of data (Nakata, 2007; Smith, 2012).

Modernisation, Cultural Resilience and Selective Adaptation

Modernisation can produce both erosion and adaptation. In Orang Asli contexts,

changes in consumption, settlement, religion, healthcare, environment, and ritual practices have been documented as communities respond to new institutions and opportunities (Ahmad Khairuddin & Hanafiah, 2021; Rosnon et al., 2018). The transformation of siwang/sewang from ritual contexts to public performance in some communities also illustrates that cultural continuity can occur through a change in function rather than through exact replication (Jalaludin & Abdullah, 2020).

In the present study, 'modern adaptation' is used in a specific sense: (a) plural or hybrid healing choices that combine clinic/hospital use with traditional medicine; (b) commercial adaptation through packaging, pricing, exhibitions, and digital communication; (c) tourism integration where culturally appropriate; and (d) institutional collaboration, particularly with JAKOA. Cultural resilience is therefore treated as the capacity to retain meaningful knowledge and identity while selectively adjusting practice to changing social, economic, and environmental conditions.

Intergenerational Transmission as Situated Learning

The transmission of Temiar medicinal knowledge is also interpreted through Lave and Wenger's (1991) concept of situated learning and communities of practice. Knowledge is learned not only through explicit teaching but also through participation in everyday activities with more experienced family and community members. Accompanying elders to collect herbs, observing preparation techniques, helping with sales, and participating in sewang-related preparation can therefore be understood as legitimate forms of learning through practice. This perspective clarifies why apparently informal participation may be central to knowledge continuity.

Malaysian Policy Context

The policy relevance of this study extends across heritage, health, and Orang Asli development. The National Heritage Act 2005 (Act 645) provides a national framework for protecting cultural heritage, including intangible heritage. Traditional medicine and cultural performance can therefore be considered within wider efforts to document, safeguard, and transmit heritage without detaching it from the communities that hold it.

The Traditional and Complementary Medicine Act 2016 (Act 775) provides a regulatory context for recognised traditional and complementary medicine practices in Malaysia. The present study does not assess regulatory compliance or clinical efficacy; rather, it highlights that safety, quality, practitioner requirements, and applicable regulation become increasingly relevant when community-based practices or products move into formal markets or services. JAKOA's Strategic Plan 2023–2026 provides a further institutional context for Orang Asli development, while the Malaysia MADANI framework emphasises sustainability, wellbeing, respect for tradition, and local wisdom. At the international level, the findings are relevant

to SDG 3 (Good Health and Well-Being) and SDG 11.4, which calls for stronger efforts to safeguard cultural and natural heritage (United Nations, 2015).

Conceptual Framework and Theoretical Contribution

Figure 1 summarises the analytical framework developed for this study. Modernisation pressures do not act on traditional knowledge in a simple one-way process. Instead, the outcome depends on adaptive mechanisms, selective innovation, institutional support, and culturally defined safeguards. The theoretical contribution is a community-led adaptive sustainability perspective: continuity is produced through selective change, and the legitimacy of that change depends on community control over knowledge, practice, and cultural boundaries.

METHODS

Research Design and Study Setting

This study employed a qualitative ethnographic approach at RPS Kuala Betis, Gua Musang, Kelantan. Ethnography was selected to understand traditional medicine in the community's natural social and cultural context. Data collection combines participant observation, interviews, and document analysis. Interviews were the principal method for eliciting traditional knowledge and accounts of cultural change, while participant observation enabled the researcher to observe and participate in herbal preparation and sewang-related activities. Documentary materials were used to support and contextualise field evidence.

Sampling and Informants

A total of 22 informants participated in the study: 14 women and 8 men. Their roles

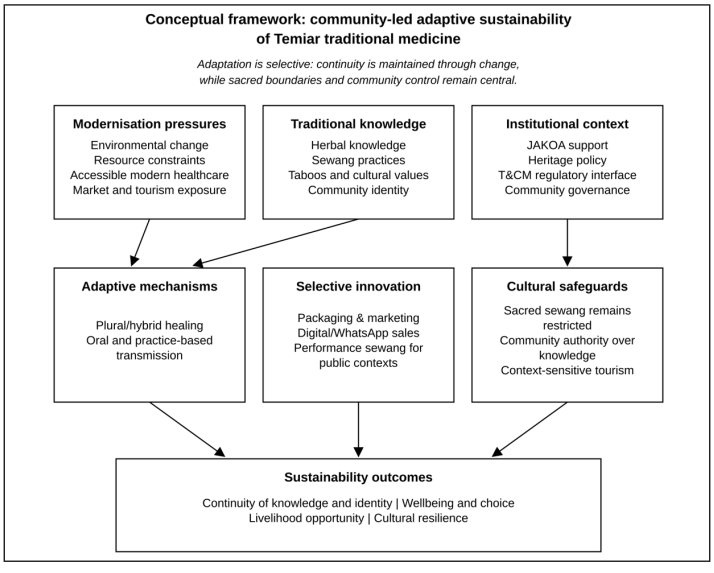


Figure 1. Conceptual framework linking modernisation, traditional knowledge, adaptation mechanisms, and sustainability outcomes
Source: Developed for this study

comprised three traditional midwives, eight community residents, two village heads, one JAKOA officer, two Orang Asli religious teachers (GOA), two members of the neighbouring Malay community, two Ministry of Health personnel, one academic, and one school teacher. Informants were selected because they had relevant knowledge, experience, or community/institutional roles that could address the study objectives. A culturally knowledgeable key informant with extensive experience in traditional medicine and herbal-product marketing also assisted the researcher in identifying other relevant informants. Participants were coded IR1-IR22 during data organisation and reporting.

Sample adequacy was assessed through prolonged observation and repeated interviewing. Comparable questions were asked across informants to obtain confirmation and certainty, and information was checked repeatedly until the observations and interviews produced sufficiently consistent accounts and no further issues emerged; this was treated as the point of data saturation. Member checking with the key informant was also conducted throughout data collection to confirm that the information obtained was accurate and relevant.

Fieldwork Procedure and Ethics

Preliminary field visits were conducted on 1-2 March and 14-16 May 2023. Formal fieldwork then took place from July 2023 to August 2024, with documented visits on 16 July 2023, 4 August 2023, 19-23 September 2023, 10-17 December 2023, 4-5 April 2024, 22-26 May 2024, and 4-8 August 2024. The researcher made repeated visits to the study area and, as part of the fieldwork, stayed with residents to facilitate direct observation, in-depth interviewing, and participation in everyday community activities.

Before fieldwork, community members were informed that the study would be conducted, the research objectives were explained, and their cooperation was sought. Official permission to conduct fieldwork at RPS Kuala Betis was obtained from the Department of Orang Asli Development (JAKOA), and the permission letter is retained in the thesis appendix. In the manuscript, participants are reported using IR codes rather than personal names.

Data Analysis and Triangulation

Interview data were transcribed verbatim in Microsoft Word before being organised and imported into NVivo 12 Plus. Audio recordings, field notes, photographs, and videos were reviewed during familiarisation. Analysis proceeded through transcription, data organisation, familiarisation, coding, theme development, reliability and validity checks, and reporting. Relevant excerpts from the transcripts were coded into NVivo Nodes. The theme development was guided by the research questions, research objectives, and previous literature, while material emerging from fieldwork was also used to identify and refine categories and themes.

Trustworthiness was strengthened through repeated data checking, data saturation, member checking, expert validation, and triangulation. Member checking was undertaken throughout data collection by comparing information across informants and asking the key informant to confirm the accuracy of the data. One expert reviewed the themes, interview questions, and analysed data through discussions held from the early stages of the research until completion and confirmed the credibility of the analysed material.

Triangulation drew on interviews, participant observation, and document analysis. Interview accounts were compared with observed practices and documentary/contextual evidence; convergence and inconsistencies were considered during interpretation. For example, accounts of practical knowledge transfer were considered alongside observations of younger family members participating in herbal preparation, while accounts of market adaptation and institutional support were considered alongside observed packaging, training, infrastructure, exhibition, and carnival activities.

RESULTS

The findings are organised thematically to answer the research aim directly. Rather than repeating descriptive material across subsections, each theme identifies a distinct sustainability strategy and separates empirical evidence from later theoretical interpretation in the Discussion.

Selective Adaptation and Plural Healing

The first form of adaptation is the pragmatic use of modern healthcare alongside traditional practices. Participants described access constraints to herbal resources and the convenience of clinics or hospitals. IR1 explained:

> There are no more medicines here, all the palm oil plantations are far behind, getting to the highway is difficult. I usually go to the hospital if I'm sick. (IR1)

IR2 similarly described using a clinic while still retaining sewang:

> If I'm sick, I go to the clinic, it's easier, but I still use sewang as well… (IR2)

These accounts show that modern medicine is not necessarily replacing traditional medicine in a complete or linear way. Instead, some community members make situational choices based on accessibility, perceived need, and cultural preference. In the context of the research aim, this plural approach represents a strategy of adaptation: traditional medicine remains relevant even when biomedical services become part of everyday health-seeking behaviour.

Intergenerational Transmission Through Oral and Practical Learning

Knowledge transmission occurs through two closely connected pathways: oral communication and participation in practice. Oral transmission takes place through

stories, songs, advice, taboos, everyday conversation, family interaction, and explanations provided by healers, midwives, elders, and other knowledge holders. Because much of this learning is embedded in daily life, younger people may acquire values and procedural knowledge gradually rather than through formal lessons.

Practical transmission occurs when younger family or community members accompany experienced people during forest visits, plant selection, harvesting, processing, preparation, or sewang-related activities. IR3 described being accompanied by a grandson when obtaining plants:

> Grandson brings it, rents a car. Women have to bring their husbands too…
>
> (IR3)

Field observations also recorded younger relatives participating in herbal preparation and online sales, as well as the preparation of tempo' used in sewang activities (Figure 2). These observations are important because they show that participation is a mechanism of learning. They also qualify for the broad claim that younger people are uninterested: interest is uneven, but opportunities for participation can sustain transmission within particular families and networks.



Figure 2. Practice-based transmission: an informant preparing tempo' used in sewang activities
Source: Field study, 2023

Herbal Products, Commercial Adaptation and Ecotourism Potential

A third strategy is the adaptation of herbal products to contemporary markets. The field evidence indicates that a small number of participants were especially active in marketing, while other community members contributed to collection, preparation, or packaging. Reported retail prices ranged from RM15 to RM30 depending on the product and its intended use. IR3 contrasted earlier sales in simple plastic packaging with later changes following training:

> Back in the 90s, I sold it for 5 Ringgit per pack, just in a basket with plastic. After attending a course by JAKOA, I started packaging it in containers like this; it looks nicer. People also liked it and wanted to buy it.
>
> (IR3)

The shift from loose or simple packaging to labelled and more standardised presentation (Figures 3 and 4) demonstrates commercial adaptation. Figure 5 shows herbal product packaging with price labels and usage information. It can improve visibility and customer confidence, but the study does not test product efficacy or safety and should not be read as clinical endorsement. Likewise, the present ethnographic evidence supports the



Figure 3. Traditional presentation of ubi seduwang in a basket before packaging improvements
Source: Field study, 2023



Figure 4. Improved packaging of herbal products, illustrating adaptation to more formal market presentation
Source: Field study, 2023



Figure 5. Herbal product packaging with price labels and usage information
Source: Field study, 2023

existence of livelihood opportunities, but it does not provide a systematic estimate of household income, market size, or long-term ecological sustainability.

JAKOA Support, Entrepreneurship and Market Constraints

JAKOA support was visible in training, infrastructure, exhibitions, and entrepreneurship opportunities. Informants described courses on preparation, cleanliness, packaging, promotion, and marketing. The resulting packaging changes are visible in the field images (Figures 6 and 7), and some marketing was conducted through WhatsApp where internet access is allowed. This indicates that institutional support can strengthen the community's capacity to adapt traditional products to contemporary markets.



Figure 6. Packaging is produced after skills and marketing training
Source: Field study, 2023



Figure 7. A later packaging design used for Temiar herbal products
Source: Field study, 2023

Institutional support, however, did not remove all market constraints. JAKOA-linked shop facilities (Figure 8) were described as affordable, but one herbal shop was reported to have low customer traffic because of its location. IR3 stated:

> JAKOA gave me a shop near Kuala Betis, rent RM30 a month, plus utility bills. I didn't sell there because there were no buyers. In a month, I could barely make RM50. I would stay there all day, but I wouldn't even make RM1. (IR3)

This account shows why infrastructure provision must be evaluated together with location, demand, transport, and digital connectivity. The existence of a shop does not guarantee livelihood sustainability.

Exhibitions and entrepreneurship carnivals (Figure 9) created a different market channel. IR3 described JAKOA support for accommodation, meals, and participation costs and reported a strong sales outcome during a Putrajaya carnival.



Figure 8. Traditional herbal medicine shop provided as an entrepreneurship facility; informants reported location-related market constraints
Source: Field study, 2023



Figure 9. Informants marketing herbal products at an entrepreneurship carnival
Source: Field study, 2023

This is useful for contextual evidence of commercial opportunity, although the amount represents one reported event rather than a general or average income measure.

> At the JAKOA entrepreneurship carnival, we get RM50, and they cover hotel accommodations and meals. JAKOA sets the price, organizes everything, but we sell ourselves. Prices go up a little, about RM5. Grandma sold in Putrajaya and made RM3000… (IR3)

Cultural Boundaries: Sacred Sewang and Public Performance

The findings also show that not every cultural practice is suitable for commercialisation or ecotourism. Medical sewang and death sewang were described as sacred and connected to chants, taboos, spiritual meanings, and restrictions on participation. The field analysis therefore indicates that these forms should not be promoted as tourist products. This distinction is a central sustainability finding because it demonstrates community-defined limits to adaptation.

Performance sewang is different. It is used for entertainment, welcoming visitors, competitions, or public cultural presentations and does not carry the same sacred restrictions. IR6 described a recent public performance:

> Recently, we performed sewang in Gua Musang; the Teranek village group won. We performed sewang for fun. (IR6)

The Kampung Teranek group representing the Temiar community at RPS Kuala Betis won first place in a traditional dance category at a 2023 Orang Asli sports carnival in Gua Musang (Figure 10). This supports the potential of performance sewang as a culturally appropriate public-facing activity, provided that the distinction from sacred healing sewang remains clear.



Figure 10. Kampung Teranek Temiar performance sewang group after winning a 2023 traditional dance competition; performance sewang is distinct from sacred healing sewang
Source: Field study, 2023

DISCUSSION

From Preservation to Community-led Adaptive Sustainability

The findings support a shift from a static idea of preservation to an adaptive understanding of sustainability. Temiar traditional medicine is not sustained by isolating it from modern life. It is sustained through selective decisions about what to retain, what to modify, and what to protect. The use of clinics alongside sewang, improved herbal packaging, participation in carnivals, and the separation of sacred from performance sewang all demonstrate continuity through change.

This pattern is consistent with the broader argument that Indigenous and local knowledge systems are dynamic rather than frozen in the past (Fernández-Llamazares et al., 2021; Turner et al., 2022). The Temiar case adds an ethnographic mechanism to that discussion: adaptive continuity operates through plural healing, practice-based learning, commercial innovation, institutional support, and culturally defined limits. These mechanisms together form the paper's theoretical contribution, described here as community-led adaptive sustainability.

The same perspective clarifies the meaning of cultural resilience. Resilience is not measured by whether every historical practice remains unchanged. Instead, it is visible in the community's capacity to maintain meaningful relationships, knowledge, identity, and choice under changing conditions. Importantly, the finding that sacred medical and death sewang should not be converted into tourism products shows that successful adaptation may also involve refusal and boundary-setting.

Intergenerational Learning and Communities of Practice

The distinction between oral and practical transmission becomes analytically stronger when interpreted as situated learning. Lave and Wenger (1991) explain that newcomers learn through participation in shared practice with more experienced members. In RPS Kuala Betis, accompanying an elder to collect herbs, observing processing, helping with packaging or online sales, and learning sewang-related preparation are not incidental activities; they are the social settings in which knowledge becomes embodied. This suggests that community-led learning programmes should not rely only on classroom-style documentation. They should create supported opportunities for younger people to participate with knowledge holders in real cultural and livelihood practices.

Biocultural Knowledge, Community Authority and Decolonial Relevance

The Temiar case also illustrates why biocultural knowledge cannot be separated from the authority of knowledge holders. Contemporary work on Indigenous cultural health and wellbeing emphasises that culture, identity, community relationships, and health are closely connected (Biles et al., 2024). A sovereignty perspective further suggests that interventions are more

appropriate when Indigenous communities retain decision-making authority (Joseph, 2024). For this study, that means policy and tourism programmes should not treat traditional knowledge as an unrestricted cultural resource. Community consent, control over representation, and protection of sacred knowledge are integral to sustainability, consistent with decolonial research principles (Nakata, 2007; Smith, 2012).

Comparison with Previous Orang Asli Research and Novelty

Previous studies have established important foundations: Syuhana Khalid (2014) discussed JAKOA's role in preserving Orang Asli traditional knowledge; Rosnon et al. (2018) examined acculturation and consumerism; Ahmad Khairuddin and Hanafiah (2021) analysed cultural change among Temiar at another settlement; and Jalaludin and Abdullah (2020) documented changes in siwang ritual among the Semai. Lokman et al. (2024) focused specifically on Temiar herbal remedies and their economic/ecotourism potential at RPS Kuala Betis. The novelty of the present study lies in integrating these dimensions: it treats herbs and sewang as parts of one sustainability system and identifies the interaction among intergenerational learning, hybrid health choices, commercial adaptation, institutional support, and cultural safeguards.

CONCLUSION

The Temiar community at RPS Kuala Betis sustains traditional medicine through a combination of continuity and selective adaptation. Knowledge is transmitted orally and through participation; biomedical services and traditional practices can coexist; herbal products are adapted through packaging, marketing, and institutional support; and performance sewang can be shared publicly while sacred forms remain protected. These findings answer the research aim by showing that sustainability is produced through several interacting strategies rather than a single preservation activity. The study's main analytical contribution is the concept of community-led adaptive sustainability: traditions remain relevant when communities can selectively innovate while retaining authority over knowledge, practice, and cultural boundaries. For policy makers and support agencies, this means that heritage, health, tourism, and livelihood initiatives should strengthen community capability and intergenerational transmission without converting culturally restricted knowledge into a commodity. Future multi-site and longitudinal research is needed to assess the broader applicability, economic outcomes, and ecological sustainability of these strategies.

IMPLICATIONS OF THE STUDY

For the Orang Asli community, the strongest practical implication is the value of community-led transmission. Programmes can support elder-youth apprenticeships, family-based forest learning, herbal preparation, culturally appropriate documentation, and opportunities for

younger people to participate in marketing or performance activities. Such programmes should be designed with knowledge holders and should allow the community to decide which knowledge can be documented or shared. Related work in Kelantan shows that strategic planning to build social trust in technical and vocational education and training (TVET) is important for Indigenous youth, suggesting that skills and entrepreneurship programmes should be designed in ways that are locally trusted, culturally responsive, and relevant to youth aspirations (Azizan et al., 2024).

For JAKOA and other programme designers, the findings indicate that entrepreneurship support should combine training with market access, digital connectivity, suitable locations, and follow-up evaluation. The reported difficulty of operating a low-traffic shop illustrates that infrastructure without demand may have limited impact. Exhibitions and carnivals can widen exposure, but future programmes should also assess income stability, production capacity, ecological harvesting limits, and benefit distribution rather than relying only on event-level sales.

For heritage policy, the study supports the safeguarding of traditional medicine and performance knowledge as living, community-based heritage under the broader intent of the National Heritage Act 2005. Safeguarding should prioritise transmission and community control rather than only display or documentation. Where herbal products or healing services enter formal commercial or health settings, engagement with applicable safety, quality, and T&CM regulatory requirements is also important.

The findings are relevant to Malaysia MADANI because sustainability and wellbeing are linked here to local wisdom, respectful cultural continuity, and community capability. They also speak to SDG 3 by highlighting culturally meaningful dimensions of health and wellbeing, and to SDG 11.4 by demonstrating the importance of protecting living cultural heritage. These policy links should not be interpreted as proof of clinical effectiveness of particular remedies; the study contribution is social, cultural, and policy-oriented rather than biomedical.

LIMITATIONS AND FUTURE RESEARCH

This study is a qualitative, single-site ethnography, and the findings should not be generalised statistically to all Temiar or Orang Asli communities. Informants were selected for their relevant knowledge, experience, and community or institutional roles, which is appropriate for obtaining information-rich accounts but limits population-level inference. A complete age distribution was not systematically reported for all 22 informants. The study also does not provide systematic estimates of the number of active practitioners, frequency of treatment use, household income from herbal products, or the ecological sustainability of harvesting. Reported sales values are event-specific accounts rather than a longitudinal economic dataset.

The researcher's presence and interpretation may also shape ethnographic

data. Future work should therefore make researcher positionality more explicit and, where possible, incorporate community co-analysis or community review of interpretations. Comparative research across Temiar settlements and other Orang Asli groups could test whether the mechanisms identified here recur in different social and ecological settings. Longitudinal studies could examine changes in youth participation, knowledge transmission, market outcomes, and resource availability. Separate biomedical or pharmacological research would be required to assess the efficacy and safety of specific herbal remedies; such work should follow ethical, consent, and benefit-sharing principles appropriate to Indigenous knowledge.

ACKNOWLEDGEMENT

The researcher would like to express his appreciation and thanks to the Malaysian Ministry of Higher Education for the sponsorship of the Fundamental Research Grant Scheme (FRGS) under Project ID (432414-462187) and reference number (FRGS/1/2022/WAB08/UNISZA/02/1) for funding and support them to realise the publication of this article. In addition, the researcher would like to express his infinite gratitude for the support and assistance whether directly or indirectly involved for this article to be published.

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